BZT52 series

Single Zener diodes in a SOD123 package

Rev. 1 — 16 March 2017 Product data sheet

1 Product profile

1.1 General description

General-purpose Zener diodes in a SOD123 small Surface-Mounted Device (SMD) plastic package.

1.2 Features and benefits

- Total power dissipation: ≤ 590 mW
- Wide working voltage range: nominal 2.4 V to 75 V (E24 range)
- Small plastic package suitable for surface-mounted design
- Low differential resistance
- AEC-Q101 qualified

1.3 Applications

- General regulation functions

1.4 Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_F	forward voltage	I_F = 10 mA	[1]	-	-	0.9	V
P_{tot}	total power dissipation	T_{amb} ≤ 25 °C	[2]	-	-	350	mW
			[3]	-	-	590	mW

[1] Pulse test: t_p ≤ 300 µs; δ ≤ 0.02.
[2] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.
[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm^2.

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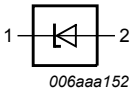
2 Pinning information

Table 2. Pinning

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode[1]		
2	A	anode		

[1] The marking bar indicates the cathode.

3 Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BZT52-C2V4 to BZT52-C75[1]	-	plastic surface-mounted package; 2 leads	SOD123

[1] The series consists of 37 types with nominal working voltages from 2.4 V to 75 V.

4 Marking

Table 4. Marking codes

Type number	Marking code	Type number	Marking code	Type number	Marking code	Type number	Marking code
BZT52-C2V4	C1	BZT52-C6V2	CB	BZT52-C16	CM	BZT52-C43	CY
BZT52-C2V7	C2	BZT52-C6V8	CC	BZT52-C18	CN	BZT52-C47	D1
BZT52-C3V0	C3	BZT52-C7V5	CD	BZT52-C20	CP	BZT52-C51	D2
BZT52-C3V3	C4	BZT52-C8V2	CE	BZT52-C22	CQ	BZT52-C56	D3
BZT52-C3V6	C5	BZT52-C9V1	CF	BZT52-C24	CR	BZT52-C62	D4
BZT52-C3V9	C6	BZT52-C10	CG	BZT52-C27	CS	BZT52-C68	D5
BZT52-C4V3	C7	BZT52-C11	CH	BZT52-C30	CT	BZT52-C75	D6
BZT52-C4V7	C8	BZT52-C12	CJ	BZT52-C33	CU	-	-
BZT52-C5V1	C9	BZT52-C13	CK	BZT52-C36	CV	-	-
BZT52-C5V6	CA	BZT52-C15	CL	BZT52-C39	CW	-	-

5 Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Max	Unit
I_F	forward current			-	250	mA
I_{ZSM}	non-repetitive peak reverse current			-	see Table 8, 9 and 10	
P_{ZSM}	non-repetitive peak power dissipation		[1]	-	40	W
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[2]	-	350	mW
			[3]	-	590	mW
T_j	junction temperature			-	150	
T_{amb}	ambient temperature			−55	+150	°C
T_{stg}	storage temperature			−65	+150	°C

[1] t_p = 100 µs; square wave; T_j = 25 °C prior to surge.
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm^2.

6 Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	350	K/W
			[2]	-	-	210	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[3]	-	-	55	K/W

[1] Device mounted on an FR4 Printed-Circuit Board (PCB),single-sided copper, tin-plated and standard footprint.
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm^2.
[3] Soldering point of cathode tab.

7 Characteristics

Table 7. Characteristics

T_j = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_F	forward voltage	I_F = 10 mA	[1]	-	-	0.9	V

[1] Pulse test: $t_p \leq 300$ µs; $\delta \leq 0.02$.

Table 8. Characteristics per type; BZT52-C2V4 to BZT52-C24

T_j = 25 °C unless otherwise specified.

BZT52 -xxx	Sel	Working voltage V_Z (V); I_Z = 5 mA		Maximum differential resistance r_{dif} (Ω)		Reverse current I_R (µA)		Temperature coefficient S_Z (mV/K); I_Z = 5 mA		Diode capacitance C_d (pF)[1]	Non-repetitive peak reverse current I_{ZSM} (A)[2]
		Min	Max	I_Z = 1 mA	I_Z = 5 mA	Max	V_R (V)	Min	Max	Max	Max
2V4	C	2.2	2.6	400	85	50	1	−3.5	0.0	450	6.0
2V7	C	2.5	2.9	500	83	20	1	−3.5	0.0	450	6.0
3V0	C	2.8	3.2	500	95	10	1	−3.5	0.0	450	6.0
3V3	C	3.1	3.5	500	95	5	1	−3.5	0.0	450	6.0
3V6	C	3.4	3.8	500	95	5	1	−3.5	0.0	450	6.0
3V9	C	3.7	4.1	500	95	3	1	−3.5	0.0	450	6.0
4V3	C	4.0	4.6	500	95	3	1	−3.5	0.0	450	6.0
4V7	C	4.4	5.0	500	78	3	2	−3.5	0.2	300	6.0
5V1	C	4.8	5.4	480	60	2	2	−2.7	1.2	300	6.0
5V6	C	5.2	6.0	400	40	1	2	−2.0	2.5	300	6.0
6V2	C	5.8	6.6	150	10	3	4	0.4	3.7	200	6.0
6V8	C	6.4	7.2	80	8	2	4	1.2	4.5	200	6.0
7V5	C	7.0	7.9	80	10	1	5	2.5	5.3	150	4.0
8V2	C	7.7	8.7	80	10	0.7	5	3.2	6.2	150	4.0
9V1	C	8.5	9.6	100	10	0.5	6	3.8	7	150	3.0
10	C	9.4	10.6	70	10	0.2	7	4.5	8	90	3.0
11	C	10.4	11.6	70	10	0.1	8	5.4	9.0	85	2.5
12	C	11.4	12.7	90	10	0.1	8	6.0	10.0	85	2.5
13	C	12.4	14.1	110	10	0.1	8	7.0	11.0	80	2.5
15	C	13.8	15.6	110	15	0.05	10.5	9.2	13.0	75	2.0
16	C	15.3	17.1	170	20	0.05	11.2	10.4	14.0	75	1.5
18	C	16.8	19.1	170	20	0.05	12.6	12.4	16.0	70	1.5
20	C	18.8	21.2	220	20	0.05	14	14.4	18.0	60	1.5
22	C	20.8	23.3	220	25	0.05	15.4	16.4	20.0	60	1.25
24	C	22.8	25.6	220	30	0.05	16.8	18.4	22.0	55	1.25

[1] f = 1 MHz; V_R = 0 V.
[2] t_p = 100 µs; T_{amb} = 25 °C.

Table 9. Characteristics per type; BZT52-C27 to BZT52-C51

T_j = 25 °C unless otherwise specified.

BZT52 -xxx	Sel	Working voltage V_Z (V); I_Z = 2 mA		Maximum differential resistance r_{dif} (Ω)		Reverse current I_R (µA)		Temperature coefficient S_Z (mV/K); I_Z = 5 mA		Diode capacitance C_d (pF)[1]	Non-repetitive peak reverse current I_{ZSM} (A)[2]
		Min	Max	I_Z = 1 mA	I_Z = 5 mA	Max	V_R (V)	Min	Max	Max	Max
27	C	25.1	28.9	250	40	0.05	18.9	21.4	25.3	50	1.0
30	C	28.0	32.0	250	40	0.05	21	24.4	29.4	50	1.0
33	C	31.0	35.0	250	40	0.05	23.1	27.4	33.4	45	0.9
36	C	34.0	38.0	250	60	0.05	25.2	30.4	37.4	45	0.8
39	C	37.0	41.0	300	75	0.05	27.3	33.4	41.2	45	0.7
43	C	40.0	46.0	325	80	0.05	30.1	37.6	46.6	40	0.6
47	C	44.0	50.0	325	90	0.05	32.9	42.0	51.8	40	0.5
51	C	48.0	54.0	350	100	0.05	35.7	46.6	57.2	40	0.4

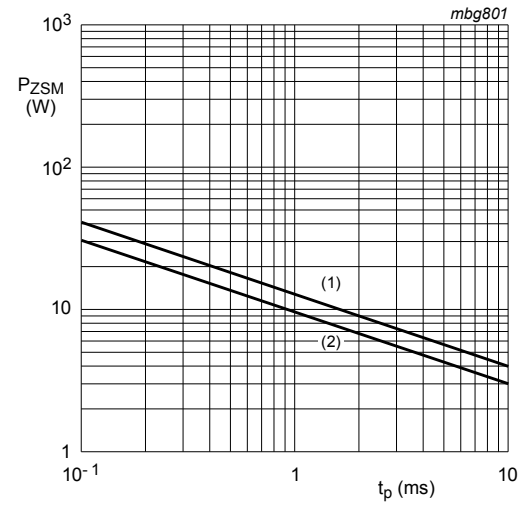
[1] f = 1 MHz; V_R = 0 V.
[2] t_p = 100 µs; T_{amb} = 25 °C.

Table 10. Characteristics per type; BZT52-C56 to BZT52-C75

T_j = 25 °C unless otherwise specified.

BZT52 -xxx	Sel	Working voltage V_Z (V); I_Z = 2 mA		Maximum differential resistance r_{dif} (Ω)		Reverse current I_R (µA)		Temperature coefficient S_Z (mV/K); I_Z = 5 mA		Diode capacitance C_d (pF)[1]	Non-repetitive peak reverse current I_{ZSM} (A)[2]
		Min	Max	I_Z = 0.5 mA	I_Z = 2 mA	Max	V_R (V)	Min	Max	Max	Max
56	C	52.0	60.0	375	120	0.05	39.2	52.2	63.8	40	0.3
62	C	58.0	66.0	400	140	0.05	43.4	58.8	71.6	35	0.3
68	C	64.0	72.0	400	160	0.05	47.6	65.6	79.8	35	0.25
75	C	70.0	79.0	400	175	0.05	52.5	73.4	88.6	35	0.20

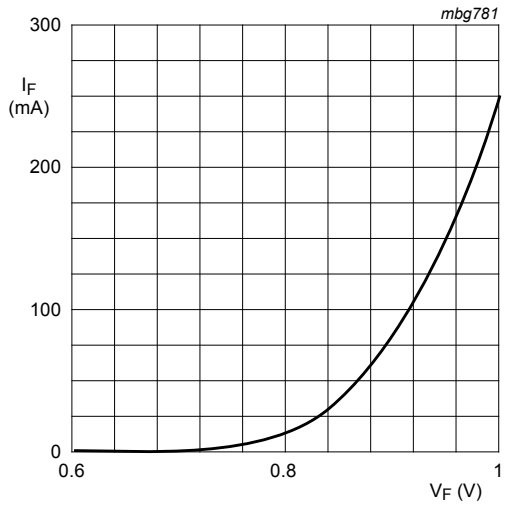
[1] f = 1 MHz; V_R = 0 V.
[2] t_p = 100 µs; T_{amb} = 25 °C.



(1) T_j = 25 °C (prior to surge)

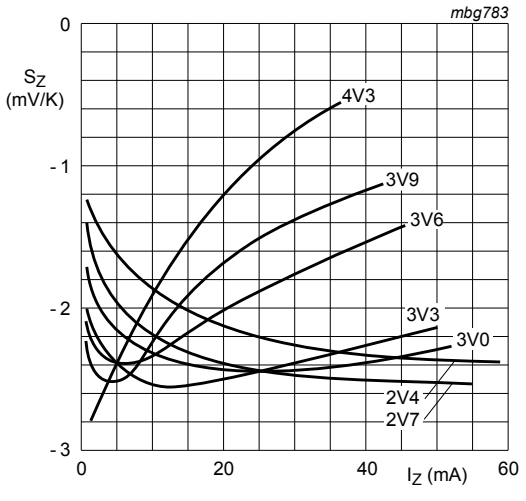
(2) T_j = 150 °C (prior to surge)

Figure 1. Non-repetitive peak reverse power dissipation as a function of pulse duration; maximum values



T_j = 25 °C

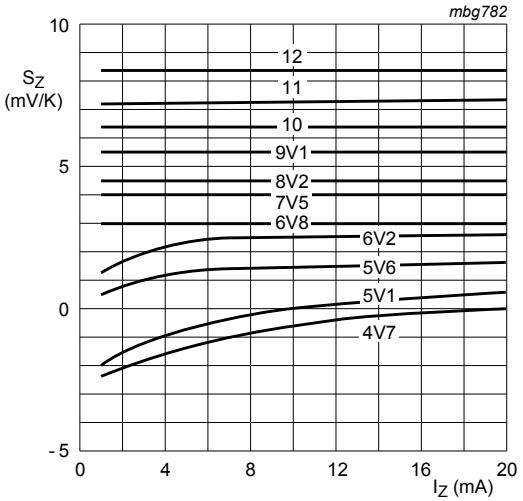
Figure 2. Forward current as a function of forward voltage; typical values



BZT52-C2V4 to BZT52-C4V3

T_j = 25 °C to 150 °C

Figure 3. Temperature coefficient as a function of working current; typical values



BZT52-C4V7 to BZT52-C12

T_j = 25 °C to 150 °C

Figure 4. Temperature coefficient as a function of working current; typical values

8 Test information

8.1 Quality information

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard Q101 - Stress test qualification for discrete semiconductors, and is suitable for use in automotive applications.

9 Package outline

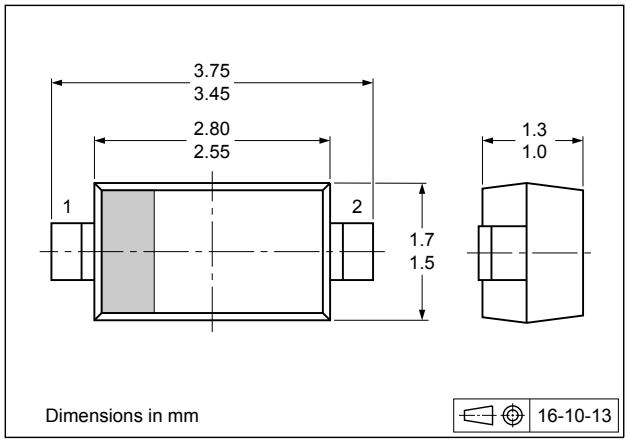


Figure 5. Package outline SOD123

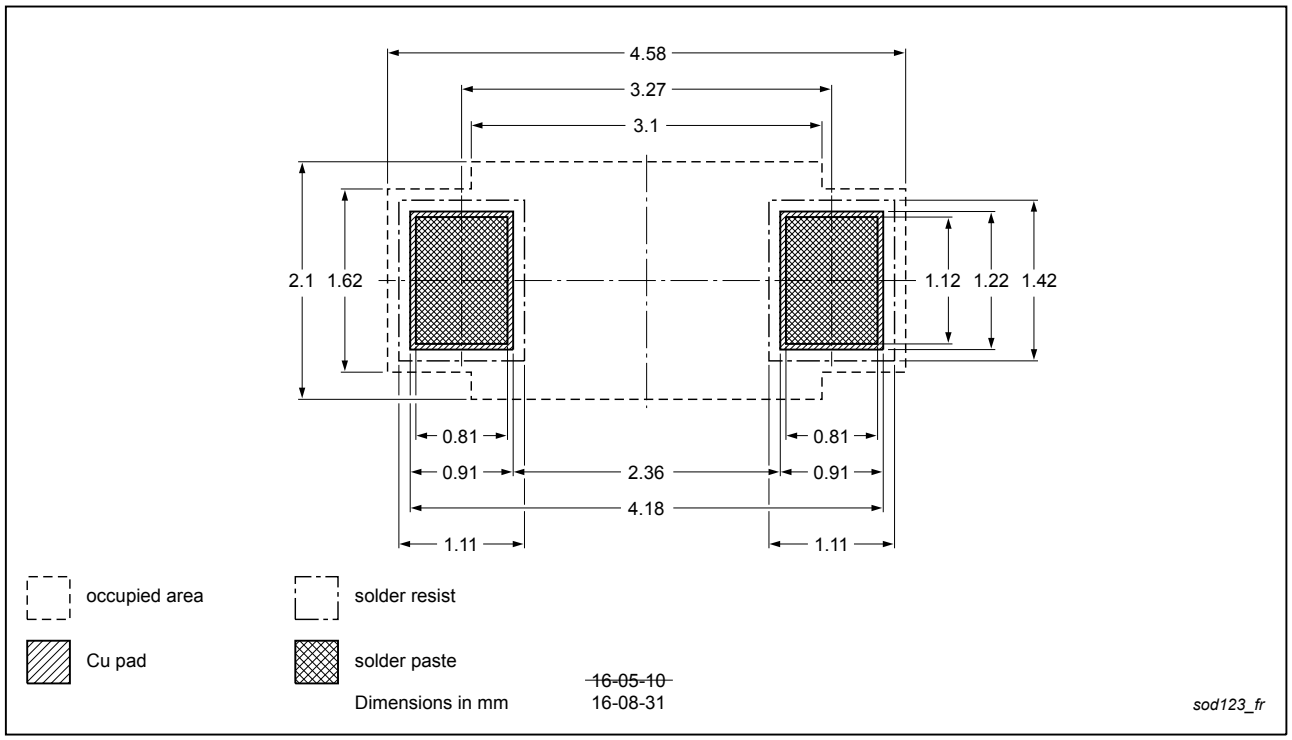
10 Packing information

Table 11. Packing methods

The indicated -xxx are the last three digits of the 12NC ordering code.

Type number	Package	Description	Packing quantity	
			3000	10000
BZT52-C2V4 to BZT52-C75	SOD123	4 mm pitch, 8 mm tape and reel	-115	-118

11 Soldering



Reflow soldering is the only recommended soldering method.
Dimensions in mm.

Figure 6. Reflow soldering footprint SOD123

12 Revision history

Table 12. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BZT52_SER v.1	20170316	Product data sheet	-	-

13 Legal information

13.1 Data sheet status

Document status[1][2]	Product status[3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

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